

10/3/2017 "Life is a journey, not a destination." -Steven Tyler

HW: "2017 A2 CC Properties of Exponents" #4, 6, 8, 14, 18, 20, 22, 27, 35, 38
Test 2 on Monday 10/16

AIM: Properties of Exponents?

Warm Up:

$$3) \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$$

$$5) \frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$$

$$7) \frac{3}{\sqrt{3}} = \frac{3}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3\sqrt{3}}{3} = \sqrt{3}$$

$$9) \frac{12}{\sqrt{27}} \cdot \frac{\sqrt{27}}{\sqrt{27}} = \frac{12\sqrt{27}}{27} = \frac{12\sqrt{9}\sqrt{3}}{27} = \frac{36\sqrt{3}}{27} = \frac{4\sqrt{3}}{3}$$

$$11) \frac{8}{\sqrt{24}} \cdot \frac{\sqrt{24}}{\sqrt{24}} = \frac{8\sqrt{24}}{24} = \frac{8\sqrt{4}\sqrt{6}}{24} = \frac{16\sqrt{6}}{24} = \frac{2\sqrt{6}}{3}$$

$$13) \frac{5\sqrt{5}}{3\sqrt{2}} = \frac{\sqrt{5}}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{10}}{3 \cdot 2} = \frac{\sqrt{10}}{6}$$

$$15) \frac{1}{3+\sqrt{5}} \cdot \frac{3-\sqrt{5}}{3-\sqrt{5}} = \frac{3-\sqrt{5}}{9-5} = \frac{3-\sqrt{5}}{4}$$

$$\textcircled{*} 15) \frac{1}{3-\sqrt{5}} \cdot \frac{3+\sqrt{5}}{3+\sqrt{5}} = \frac{\quad}{9-5} = \frac{3+\sqrt{5}}{4}$$

$$9 + \cancel{3\sqrt{5}} - \cancel{3\sqrt{5}} - \sqrt{25}$$

$$-5$$

Properties of Exponents

An exponent (also called power or degree) tells us how many times the base will be multiplied by itself. For example x^5 , the exponent is 5 and the base is x . This means that the variable x will be multiplied by itself 5 times. You can also think of this as x to the fifth power.

Below is a list of properties of exponents:

Properties	General Form	Application	Example
Product Rule Same base add exponents	$a^m a^n$	a^{m+n}	$x^5 x^3 = x^{5+3} = x^8$
Quotient Rule Same base subtract exponents	$\frac{a^m}{a^n}$	a^{m-n}	$\frac{x^9}{x^5} = x^{9-5} = x^4$
Power Rule I Power raised to a power multiply exponents.	$(a^m)^n$	a^{mn}	$(x^3)^4 = x^{3 \cdot 4} = x^{12}$ $x^3 \cdot x^3 \cdot x^3 \cdot x^3 = x^{12}$
Power Rule II Product to power distribute to each base	$(ab)^m$	$a^m \cdot b^m$	$(4x^3)^2 = 4^2 x^{3 \cdot 2} = 16x^6$
Negative Exponent I Flip and change sign to positive	$\frac{1}{a^{-m}}$	$\frac{1}{a^m}$	$x^{-3} = \frac{1}{x^3}$
Negative Exponent II Flip and change sign to positive	$\frac{1}{a^{-m}}$	$\frac{a^m}{1}$	$\frac{1}{x^{-5}} = x^5$
Zero Exponent Anything to the zero power (except 0) is one	a^0	$a^0 = 1$	$(-4x)^0 = 1$

$$\begin{array}{c} \textcircled{-4x^0} \\ \downarrow \\ -4 \cdot 1 = -4 \end{array}$$

Simplify:

$$2. \quad 4x^3 \cdot 2x^3$$

$$8x^6$$

$$(-9x)^0 = 1$$

$$8. \quad -(9x)^0$$

$$\boxed{-1}$$

$$13. \quad (2cd^4)^2 (cd)^5$$

$$2^2 c^2 d^{4 \cdot 2} c^5 d^5$$

$$4c^2 d^8 c^5 d^5$$

$$\boxed{4c^7 d^{13}}$$

$$19. \quad y^{-7}$$

$$5. \quad \frac{6^5}{6^3} = 6^{5-3} = 6^2 = \boxed{36}$$

$$5a) \quad \frac{6^3}{6^5} = \frac{1}{6^2} = \frac{1}{36}$$

$$10. \quad (x^2 y)^4 = (x^2)^4 (y^4)$$

$$\boxed{x^8 y^4}$$

$$17. \quad \left(\frac{x^4 y^3}{4y^3} \right)^3 = \left(\frac{x^4}{4} \right)^3 = \frac{(x^4)^3}{(4)^3}$$

$$= \boxed{\frac{x^{12}}{64y^9}}$$

$$21. \quad \frac{1}{x^{-5}}$$

$$25. x^9 \cdot x^{-7}$$

$$28. \frac{52x^6}{13x^{-7}}$$

$$33. (2x^3y^{-3})^{-2}$$

$$37. \left(\frac{-7a^2b^3c^0}{3a^3b^4c^3} \right)^{-4}$$